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Buy Health Protection With Your Food Money

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Cooperative Extension Work in Agriculture and Home Economics

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BUY HEALTH PROTECTION WITH YOUR FOOD MONEY*

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Introduction

The widespread drought of 1930, playing havoc with the productiveness of the farm and depleting the ranks of livestock, has combined with the general business depression to raise for many families the problem of providing an adequate diet with unusually limited resources in home-grown food and ready cash.

There is evidence that even in prosperous times many persons do not use the proper food to insure good health. Indigestion, constipation, soft and malformed teeth, and poorly shaped bones are some of the conditions attributable in part to unsatisfactory diet. Tuberculosis finds a foothold most readily among undernourished individuals. Although fully developed cases of such dietary deficiency diseases as scurvy, beriberi, and xerophthalmia are rarely met with in this country in normal times, a lowered efficiency may be due to insufficient amounts of the vitamins preventing these diseases, and rickets and pellagra are all too frequently encountered.

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*Prepared at the direction of the National Drought Relief Committee for the use of nutritionists, home demonstration agents, home-economics teachers, and other professional workers, by the subcommittee on nutrition information, consisting of Hazel K. Stiebeling, senior food economist, chairman; Hazel E. Munsell, senior nutrition chemist, Bureau of Home Economics; Miriam Birdseye, extension nutritionist, Office of Cooperative Extension Work, U. S. Department of Agriculture; W. H. Sebrell, passed assistant surgeon, U. S. Public Health Service; Clyde B. Schuman, director of the nutrition service, American Red Cross.

DISTRIBUTION: One copy of this circular has been sent to each extension director, State home demonstration leader, State girls' club leader, nutrition specialist, home-management specialist, and home demonstration agent, and to each county agent in the Southern States. A copy has also been sent to each State agricultural college library, State experiment station library, and bureau chief.
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Both children and adults are susceptible to pellagra, a disease brought about by the lack of a certain vitamin in the food. This disease is largely confined to certain sections of the Southern States, where many families ordinarily live very close to the margin of safety with respect to diet. It has been estimated that at least 200,000 individuals in our country suffered from pellagra in 1929. It is likely that unless effectual educational and relief measures are promptly undertaken, there will be a large number of cases in 1931.

The present situation demands that home demonstration agents, nutritionists, home-economics teachers, and other professional workers redouble their emphasis on the importance of an adequate diet in maintaining health and working efficiency in adults and good growth in children. It challenges them to discuss this problem in terms of a lowered income, or a diminished variety of home-grown foods, or both. Individuals in the professional groups suggested above may be called upon to advise on local food-relief measures, and their recommendations as to cheap but adequate diet must be sound. Scientific guidance and simple, practical teaching in food selection and meal planning are greatly needed at this particular time, and present conditions pave the way for a personal and vital approach.

This circular brings together information to help persons trained in the science of nutrition to meet this challenge and to improve this opportunity, whether in sections where pellagra is endemic or in other parts of the country.

Before proceeding to this dietary information, however, it should be pointed out that for most rural families and for many families in small towns, the teaching of food selection and nutrition needs to be supplemented by a program of home food production and conservation. By making it possible to provide an adequate diet and attractive meals with a minimum cash outlay, such a program makes for both health and economy. A "live-at-home program" has long been a major concern of the cooperative extension service in agriculture and home economics, and particularly of the home demonstration agents who work with rural home makers. Red Cross nutritionists have shown its value. Wherever it is economically sound for families to maintain a home garden, a poultry flock, and one or more cows, an appropriate home food production program should be indorsed by every agency concerned with the public health.

In order to provide for low-cost diets such as those suggested in this circular, it may often be necessary to obtain the cooperation of food dealers and business men's associations in making available certain inexpensive and nutritious foods not on the local market. On the other hand it will be necessary to stimulate a demand for these foods on the part of consumers who may be unfamiliar with their value or their use.

Some Inexpensive Protective Foods

When neither the food supply nor the purse strings limit the selection of food, it is possible to afford so large a variety that one may choose somewhat at random within each of six food groups and be reasonably sure of meeting the food requirements of the family. The food groups are cereals; milk and cheese; eggs, lean meat, and fish; fruits and vegetables; sugars; and fats.

When variety must be greatly curtailed, it is necessary to weigh with the utmost care the contributions made by each food material to the dietary. Table 1, Some Inexpensive Protective Foods, has been prepared to indicate roughly the main contributions made to the dietary by a number of the foods that offer good to excellent returns on the money invested, in terms of vitamins, protein, calcium, phosphorus, and iron. However, a well-balanced diet must include enough calories as well as sufficient protein of the right quality and enough of all the necessary minerals and vitamins to provide for growth and health.

Vitamin A is indispensable for normal growth. It keeps epithelial tissue resistant to bacterial infection, especially the lining of air passages, glands of the mouth, lungs, sinuses and ears, the eye, the digestive tract, the reproductive organs, and the bladder. Although it can be stored in the body tissues in considerable amounts, it is desirable that the diet contain at all times much more than will merely prevent these infections.

Vitamin B prevents beriberi. It stimulates the appetite, and promotes good digestion and assimilation of food. The body has only a limited capacity to store vitamin B; therefore the food supply should contain an abundance at all times.

A decided shortage of vitamin C is followed by scurvy, a disease characterized by stiffness and soreness of the joints, soreness of the gums and loosening of the teeth. It has been observed that on diets deficient but not entirely lacking in vitamin C, children become irritable and lacking in stamina, fail to grow normally, and are less resistant to infectious diseases. Shortage of vitamin C is thought to be an important factor in tooth decay and in much of the so-called rheumatism. Vitamin C is destroyed by long cooking. The use of soda in cooking vegetables also has a deleterious effect on this vitamin. Because the body does not store much vitamin C, the diet should include at all times an abundance of foods containing this vitamin.

Vitamin D is concerned with the normal metabolism of calcium and phosphorus at all ages. Rickets in young children is the most common result of a diet poorly balanced in vitamin D, calcium, and phosphorus. A generous amount of this vitamin in the diet or its equivalent in sunlight is probably also a factor in the prevention of dental caries, and a means of preventing other less prominent disturbances of mineral metabolism.

Vitamin G includes the pellagra-preventive vitamin and other relatively heat-stable water-soluble factors. This vitamin and pellagra, the disease associated with its shortage, receive further consideration in this circular because pellagra is a special problem in some sections of this country which have been stricken by the drought.

The efficacy of yeast as a pellagra preventive should not overshadow the importance of milk and lean meat as sources not only of the pellagra-preventing factor but also of proteins well adapted to growth and maintenance. American dietaries as a rule contain liberal amounts of the so-called efficient proteins. But the dietaries of people among whom pellagra is prevalent are often rather low in protein, with much of it derived from cereals, and of inferior biological value until properly supplemented.

The emphasis upon vitamins should not be interpreted as indicating any relaxation of attention to the adequate mineral supply in the food. Vitamin D as a "calcium-mobilizing" factor is not a substitute for calcium. Special consideration must be given to the ample provision of calcium, phosphorus, iron, and in some localities, of iodine. The food habits of our people do not make it safe to leave to chance the supply of these elements which are essential both to the construction and functioning of the body.

Table 1. - Some Inexpensive Protective Foods

The data in this table are intended to give only a rough indication of the value of selected food materials in the various dietary essentials. They can not be used for making quantitative comparisons between the different food materials or between the different essentials in the same food material. Data for Vitamins A, B, and C are taken from U.S.D.A. Circular 84, Vitamins in Food Materials. Data for other dietary essentials are compiled from various sources. x indicates that the food material contains the essential; xx indicates that it is a good source; and xxx indicates that it is an excellent source.

FOOD MATERIAL	Vitamins					Protein	Calcium	Phosphorus	Iron
	A	B*	C	D	G*				
Milk:									
Whole: fresh, evaporated, dried	xxx	x		x	xx	xxx	xxx	xxx	x
Skim: fresh, evaporated, dried		x			xx	xxx	xxx	xxx	x
Buttermilk	x	x			xx	xxx	xxx	xxx	x
Cheese, American	xx				x	xxx	xxx	xxx	
Eggs	xx	x		x	xx	xxx		x	xx
Meat:									
Lean muscle	x	x			xx	xxx		xx	x
Liver, kidney............	xxx	xx			xxx	xxx		xx	xx
Fish**		x			xx	xxx		xx	
Shellfish**, oysters, clams.	x	x			x	xxx		x	xx
Vegetables:									
Tomatoes, raw or canned...	xx	xx	xxx		xx				
Thin green leaves, cooked: Kale, mustard, spinach, collards, turnip greens..	xx	x			x			xx	xxx
Lettuce, green, raw	xxx	xx	xxx		x		x		x
Cabbage, green, raw	xx	xx	xxx		x		xx		xx
String beans, cooked	xx	x			x				xx

*Following the nomenclature of the American Society of Biological Chemists, Vitamin B indicates the anti-neuritic factor of the original vitamin B-complex, while vitamin G indicates the factors stable to heat, including the pellagra-preventive factor.

**Salt-water fish and shellfish contain some iodine.

Table 1. - Some Inexpensive Protective Foods (Continued)

FOOD MATERIAL	Vitamins					Pro-tein	Cal-cium	Phos-phorus	Iron
	A	B*	C	D	G*				
Roots and tubers;									
Irish potatoes, cooked....		xx	x						xx
Sweetpotatoes, yams, cooked	x								x
Carrots, raw	xxx	xx	xx				x		x
Onions, turnips, cooked,.,		xx	x				x		x
Rutabagas, raw	x	xx	xxx				x		x
Pumpkin, Hubbard squash...	xx								x
Dried peas, beans		xx			x	xx	xx	x	xx
Fruits, raw;									
Apples, peaches, pears ...	x	x	xx						
Bananas	x	x	xx						
Oranges	xx	xx	xxx				x		
Figs, fresh or dried							xx		xx
Dried prunes	xx	xx							xx
Whole Wheat Products		xx				x		xx	xx
Wheat Germ		xxx			xx			x	
Rice Polish		xx				x			
Molasses, not highly refined;									
Cane, sorghum		x					x		xxx
Butter	xxx			x					
Cod-Liver Oil	xxx			xxx					
Yeast, pure dried; bakers', brewers'		xxx			xxx				

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*Vitamin B indicates the anti-neuritic factor of the original Vitamin B-complex, while Vitamin G indicates the factors stable to heat, including the pellagra-preventive factor.

Some Foods Rich in the Pellagra-Preventive Vitamin

Table 2 lists the foods which experience indicates to be good or excellent sources of the pellagra-preventive factor, and for which we have evidence of the approximate amount required to protect a human being against the disease if his diet contains practically no other sources of this factor. These foods are milk, lean muscle meat, liver, canned salmon, tomato juice, wheat germ, and yeast. Our knowledge of the pellagra-preventive factor is still so limited, and so few foods have as yet been tested with human subjects, that only a small number can be listed here.

Table 2 should be helpful to persons who wish to study the extent of protection against pellagra provided by the low-cost market orders included in this circular. In evaluating the cost of two food materials rich in the pellagra-preventive factor, the reader should also study Table 1 to determine what other important contributions to the diet are made by each of the food materials in question. For example, yeast is very rich in the pellagra - preventive factor and is a good source of vitamin B, but in the quantities needed for the prevention or cure of pellagra it does not provide important amounts of other food essentials. On the other hand, dry skim milk may seem a more expensive source of the pellagra-preventive factor than is yeast, but in the quantities recommended for protection it supplies, in addition, vitamin B, important amounts of the so-called efficient proteins, an abundance of calcium and phosphorus, and some easily assimilable iron. Whole milk supplies vitamins A and D also. This shows that from the point of view of body building and health protection money expended for milk is well invested.

TABLE 2. - Some foods rich in the pellagra-preventive factor

This table lists food materials which available evidence indicates are important sources of the vitamin that protects against pellagra. It also shows the amount of each food material that would probably be sufficient to protect an individual if the diet were otherwise very deficient in the pellagra-preventive factor.

Food material	Amounts per person	
	Daily	Weekly
Milk*:		
Fresh, whole	1 quart	7 quarts
Skim	1 quart	7 quarts
Buttermilk	1 quart	7 quarts
Evaporated (unsweetened), whole	16 oz. (1 pint)	7 lbs.
Dried, whole	5 oz.	2.2 lbs.
skim	3.5 oz.	1.5 lbs.
Meat, lean muscle	1/2 lb.	3.5 lbs.
Liver	1/2 lb.	3.5 lbs.
Salmon, canned	1/2 lb.	3.5 lbs.
Tomato juice	1¼ quart	9 quarts
Wheat germ**	5 oz.	2.2 lbs.
Yeast, pure dried*** bakers', brewers'	1 oz. for adult 1/2 oz. for child under 12	7 oz. 3.5 oz.

(*) Unsweetened, evaporated (canned) milk is handled by most grocery stores. Further information on sources, prices, and food value may be obtained from the Evaporated Milk Association, Chicago, Ill. Information on sources, prices, and food value of dried whole and skimmed milk may be obtained from the American Dry Milk Institute, Chicago, Ill.

(**) Milling practices differ in the extent to which the germ is separated from other parts of the grain. When the mill makes a fairly thorough separation the germ meal contains relatively little bran and it is this type of product which is recommended in this circular. Wheat germ has been obtained from General Mills, Inc., Minneapolis, Minn.; Pioneer Mills (Ballard and Ballard), Louisville, Ky.; and Larrabee Flour Mills Co., Kansas City, Mo., and can doubtless be procured from local milling companies.

(***) Dried bakers' or brewers' yeast may frequently be obtained through county health officers, State health departments, or local merchants. Among others, Standard Brands, Inc., New York City, and the Northwestern Yeast Co., Chicago, sell dried bakers' yeast; the Vitamin Foods Co., Westfield, Mass.; and the Harris Laboratory, Tuckahoe, N.Y., sell dried brewers' yeast.

NOTE: Recipes for the use of wheat germ and dry skim milk may be obtained from the Bureau of Home Economics, Washington, D. C.

Low-Cost Market Orders for Families of Different Sizes

To meet the needs of professional workers who will be called upon to advise as to the best use of limited resources, suggestive low-cost weekly market orders for families of different sizes are offered in this circular.

Since the food for children should differ in kind as well as in quantity from that for adults, and since the needs of older children differ somewhat from those of younger, market orders are here suggested for families of different composition.

The food-selection standard, which extension workers have found so successful a device for emphasizing the importance of certain foods in an adequate diet, is based on a fairly generous allowance of home-grown foods. The less varied food allowance of these market orders is suggested for the present emergency, if most foods must be purchased instead of coming from the farm or garden. Where particular foods are specified in any class it is because they give in most localities the maximum nourishment and protection for their money value. Since the quantities of milk, vegetables, and lean meat suggested are somewhat lower than is wholly desirable, it is important that the foods listed in these three groups should be included as nearly as possible in the quantities specified.

Table 3 shows how the total quantities recommended from each class of food materials might be distributed among the different varieties within each class. Market order No. 2 (Table 5) indicates what quantities of fat should be included when skim milk replaces whole milk, and what proportion of molasses to sugar might be used. Following Table 5 are a few suggestions of the best things to buy when for any reason the food supply indicated in these market orders can not be obtained.

TABLE 3. - Suggestive weekly market order for low-cost dietary for family of five

This family consists of two adults at active work, a boy of 12 to 15 years, a girl of 4 to 8 years, and a child under 3 years. The order is designed primarily for a family with little home-produced food or ready cash. Any reductions in the amount of milk, tomatoes, and lean meat must be made with great discretion.

Cereals			20 - 24 lbs.
e.g.	White flour*	6-8 lbs. or bread 9-12 lbs.	
	Graham or whole wheat flour*, or cereal	4-6 " " " 6-9 "	
	Corn meal	3-5 "	
	Hominy grits, or farina, or rice	3-5 "	
	Rolled oats	1-2 "	
Milk, fresh whole (Or its equivalent* in evaporated or dried milk.)			18 - 21 qts.
Lean meat, fish, eggs, cheese			6 - 8 lbs.
e.g.	Lean beef, lamb, pork; poultry; fresh fish	3-5 lbs.	
	Dried fish 1/2 lb., or canned salmon	1 "	
	Cheese	1 "	
	Eggs	1 doz.	

Vegetables and fruits		35 - 40 lbs.
Potatoes, white and sweet, 7 lbs. each	14 lbs.	
Tomatoes, canned or fresh, 3 No. 3 cans* or	6 "	
Dried peas, beans, lentils	1-2 "	
Other vegetables e.g. kale, spinach, collards, mustard greens, beet and turnip tops, chard, or lettuce, 3 lbs. and beets, carrots, onions, turnips, 4-5 lbs.	8-10"	
Additional vegetables whenever possible.		
Fruits: Fresh or canned, as apples, bananas, berries, oranges, peaches, pears, watermelon	4-8 "	
or Dried fruit 1-2 lbs.		
Fats		3 - 4 lbs.
e.g. Salt pork, fat	1 lb.	
Lard	1 "	
Butter substitute, (Butter, if made at home)	1 "	
Peanut butter. (may also be classified as legumes)	1/2 "	
Sweets		3 - 5 lbs.
e.g. Sugar	2 lbs.	
Unrefined cane sirup or sorghum molasses*	1½ qts.	

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*See Table 8, Equivalent weights and measures of selected food materials, page 13.

Table 4. - Low Cost Weekly Market Order No. 1 For Families Of Different Sizes

The orders below are suggested for families suffering from shortage of home-grown foods and ready cash. They are not considered optimum for nutrition, but it is believed that they can be safely used. Any reduction in the suggested amounts of milk, vegetables, and of lean meat must be made with great discretion.

Family composition	2 adults; 1 child aged 3 years	2 adults; 3 children aged 2, 4, 7 years	2 adults; 5 children aged 3,5,8,12, 15 years	3 adults; 7 children aged 2,4,6,8, 10,13,15 years	4 adults
Food materials	Quantity	Quantity	Quantity	Quantity	Quantity
Flour, meal, etc. (use whole-grain cereals at least once daily).......	13-15 lbs	18-20 lbs.	20-30 lbs	35-45 lbs.	22-27 lbs.
Well-separated wheat germ or rice polish (if available)..............	1/2 "	3/4 "	1 "	1½ "	1 "
Whole milk*	9-14 qts	23-28 qts.	30-39 qts	43-46 qts.	4-8 qts.
Potatoes, Irish and sweet.	8-10 lbs	15-20 lbs.	25-30 lbs	35-40 lbs.	15-20 lbs.
Legumes, including dried beans, peas, lentils, peanut butter..........	1-2 lbs.	1-2 lbs.	1-3 lbs.	3-5 lbs.	1-3 lbs.
Tomatoes, fresh or canned; or oranges if equally cheap	4 "	6 "	9 "	12 "	6 "
Other vegetables, fresh, or canned, including some of green or yellow color, as carrots, cabbage, spinach, turnips, onions, beets, string beans; inexpensive fruit, fresh canned or dried*, as apples, bananas, berries, prunes, peaches	12-14 "	15-18 "	20-25 "	30-40 "	20-25 "
Fats, as butter, or butter substitutes, salt pork, bacon, lard, vegetable oils	2 "	2½ "	4 "	6 "	4 "
Sugar* (Use some unrefined cane molasses)..........	3 "	3 "	6 "	8 "	5 "
Lean meat, liver, fish, cheese, eggs	3-5 "	5-7 "	7-10 "	10-14 "	5-10 "
Additional eggs (for younger children)	3 eggs	8 eggs	8 eggs	8 eggs	- - -

*See Table 8, Equivalent weights and measures of selected food materials, p. 18.

Table 5. - Low-Cost Weekly Market Order No. 2 For Families of Different Sizes

The orders below are suggested for families suffering from shortage of home-grown foods and ready cash, and are based on foods generally used in regions where pellagra is prevalent. These orders are not considered optimum for nutrition, but it is believed that they can be safely used. Any reduction in the suggested amounts of milk, cod-liver oil, lean meat and vegetables must be made with great discretion.

Family composition	2 adults; 1 child aged 3 years	2 adults; 3 children aged 2, 4, 7 years	2 adults; 5 children aged 2,5,8,12, 15 years	3 adults; 7 children aged 2,4,6 8,10,13,15 years	4 adults
Food materials	Quantity	Quantity	Quantity	Quantity	Quantity
Flour, home-grown wheat, or corn meal (use some dark or whole-grain cereals)..	13-15 lbs.	18-20 lbs	20-30 lbs	35-45 lbs.	22-27 lbs.
Well-separated wheat germ or rice polish (if available)	1/2 lb.	3/4 lb.	1 lb.	1½ lbs.	1 lb.
Dry skim milk*	2 "	4 "	7 "	10 "	2 "
Potatoes, Irish and sweet..	8-10 "	15-20 "	25-30 "	35-45 "	15-20 "
Legumes, including dried beans, peas, lentils, peanut butter	1-2 "	1-2 "	1-3 "	2-5 "	1-3 "
Tomatoes, fresh or canned..	4 "	6 "	9 "	12 "	6 "
Other vegetables, fresh or canned, including some of green or yellow color, as cabbage, collards, carrots, rutabagas, onions; inexpensive fruits, fresh, canned, or dried, as apples, bananas, berries, figs, peaches	12-14 lbs	15-18 lbs	20-25 lbs	30-40 lbs.	20-25 lbs.
Salt pork, bacon or fatback	1 "	2 "	3 "	4 "	3 "
Butter, lard, vegetable oils	1½ "	2 "	3 "	5 "	2 "
Cod-liver oil	2 oz.	4 oz.	6 oz.	8 oz.	2 oz.
Sugar	1 lb.	2 lbs	3 lbs	4 lbs.	2 lbs.
Sorghum or cane molasses...	1 qt.	1 qt.	2 qts	3 qts.	2 qts.
Lean meat, fish, cheese, eggs, liver	3-5 lbs.	5-7 lbs.	7-10 lbs	10-12 lbs.	5-10 lbs.
Additional eggs (for younger children)........	3 eggs	8 eggs	8 eggs	8 eggs	- - -

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*Dry skim milk is suggested because usually it is cheaper than other forms of milk. If it is used the cod-liver oil must be added to the diet to furnish Vitamin A. Five quarts fresh whole milk or 5 pounds evaporated milk may be substituted for each pound of dry skim milk, and cod-liver oil and part of the butter substitutes may be omitted.

Comments on Market Orders

Breadstuffs.- The grains occupy much prominence in low-cost dietaries because they are important as cheap sources of energy and of protein. Their proteins are not wholly adequate, but when properly supplemented, as with milk for example, they are of great practical importance. The more highly milled the cereal, the more necessary it is to supply minerals and vitamins from other sources. In dietaries such as those suggested in this circular, in which the quantities of milk, vegetables and fruits, and lean meats are close to the minimum, it is important for the sake of iron that about one-third of the cereal should be a whole-wheat product; whole-wheat bread or flour or one of the dark (less highly refined) wheat cereals should be used about once a day. Wheat can be used whole or can be ground at home for flour or breakfast cereal.

For the sake of certain of the vitamins, it is suggested that 1 pound of wheat germ, rich both in the pellagra-preventive factor and in vitamin B, or 1 pound of rice polishings rich in vitamin B (obtainable from rice mills from August to April), be mixed with the weekly allowance of white flour or cereal to add to these diets a desirable margin of safety in these respects. Recipes for the use of these products may be obtained from the Bureau of Home Economics, Department of Agriculture, Washington, D. C. Pure dried yeast is very rich in the pellagra-preventing factor and in vitamin B; even small amounts weekly will reenforce a diet.

Milk. - A good cow or milk goat is one of the best investments a family can make to insure a satisfactory food supply. Milk contains the greatest assortment of nutrients of any single food material, and is the foundation upon which an adequate diet can most safely and easily be built. It is particularly important for its proteins of good quality, for calcium, for vitamin A, and for the pellagra-preventing factor. The amounts suggested in these dietaries are not regarded as the most desirable, but rather as minimum quantities which should be purchased by families even in straitened circumstances. For each child under 2 years of age 7 quarts of fresh whole milk should be provided weekly, and for each other child at least 5 quarts of fresh whole milk or equivalent amounts in canned or dry milk. If skim milk is used instead of whole, 1 to 2 ounces of cod-liver oil should be added weekly to the diet. Not less than 1 to 2 quarts of milk should be provided each week for each adult.

Canned milk and milk powder are convenient and economical forms in localities where it is difficult to procure good fresh milk, and where ice is not available. Evaporated milk is usually a cheaper form of milk than the fresh whole product. If fresh milk costs more than 10 or 12 cents per quart the use of evaporated whole milk in its place will decrease the cost of the food supply. Dry skim milk is usually the cheapest form if one does not own a cow. Whenever it is used, some cod-liver oil should be taken regularly to supply the fat-soluble vitamins which were removed with the cream.

Vegetables and fruits.- This class of foods is particularly important for minerals and vitamins, and should be used as freely as the home supply will permit. Every member of the family should have potatoes at least 4 or 5 times weekly, tomatoes at least two or three times, raw cabbage or other vegetables of green or yellow color at least twice weekly.

The amount of vegetables and fruits included in the weekly order is, except for potatoes, less liberal than might well be used. For this reason it is very important that the quantities of each specified vegetable be included at least to the extent suggested. Most vegetables should be cooked quickly, and only until tender. Use as little water as possible in preparing mild-flavored vegetables, and save the cooking water for soups and gravies, instead of discarding it, for in it are contained valuable minerals and vitamins. Any substitutions must be made with great discretion. Additional quantities are recommended if they can be obtained.

Fats. -Fats are important primarily as sources of energy; they also help to make a high-cereal diet palatable. Butter and certain butter substitutes carry fat soluble vitamins which are not found in lard; hence they are more nutritious and should be used if they can be afforded. If butter is more than 30 cents a pound it would be well to consider the possibility of replacing it with a less expensive butter substitute, edible oil or lard. Lard is usually the cheapest form of fat and may be used as the chief form if cod-liver oil and dry skim milk, or if fresh or evaporated whole milk are used in the quantities suggested in the weekly market orders.

Sugar.-Pure sugar provides only energy to the body. During the refining process all the minerals are removed. To replace 2 pounds of the sugar allowance with a quart of unrefined cane molasses increases greatly the iron content of the food supply, and is highly recommended in all these very limited dietaries. It should be noted that corn sirup and refined sugar sirup are cheap and wholesome forms of nourishment but do not have the nutritional importance of unrefined cane molasses.

Eggs, lean meat and fish.- Lean meats and fish are important in the dietary for their proteins of excellent quality and for their pellagra-preventive value. Locally caught fresh fish or inexpensive grades of canned salmon or haddock, or a corresponding amount of dried fish may be used as part of the lean meat allowance. The cheaper cuts of lean meat are quite as nutritious as the more expensive tender cuts, but special care is required for their preparation. Write to the Bureau of Home Economics for recipes. Try to serve lean meat, liver, fish, or eggs 3 or 4 times weekly. Lean meat as used here and in the market orders refers to any meat other than salt pork, bacon, or fatback. At least 3/4 to 1 pound of lean meat (muscle) free from bone and visible fat should be provided weekly for each adult. If the egg supply is limited, serve the children first. Eggs are important for mineral and vitamin values, as well as for protein.

Between one-third and one-half of the proteins in these dietaries are the so-called efficient proteins from animal sources. At least this much is desirable in families with growing children. Inasmuch as the

total amount of milk allowed is rather low it is desirable to include cheese occasionally as part of the adult allowance made for lean meat, as it will allow the older members of the family to release some extra milk to the children without unduly lowering the calcium supply of the adults.

With the amount of milk included, the calcium and phosphorus needs of the family are met. Iron must be safeguarded in these low-cost dietaries by the use of some whole-grain cereals, some leafy vegetables, and some molasses.

Probably no great excess of the vitamins is provided by the quantities of foods included in these market orders. Whole milk, butter, cheese, eggs, and vegetables of green or yellow color contribute vitamin A. For vitamin B dependence is placed upon the whole cereal products, fruits and vegetables, and dried peas and beans. Canned tomatoes, fresh fruits, raw cabbage and lettuce, raw carrots, and Irish potatoes, if they are not overcooked, provide vitamin C. The allowance for vitamin D is probably inadequate for a winter diet, since egg yolk is the only good source of vitamin D among our common foods, although whole milk furnishes some of this vitamin. Even if whole milk is used it would be well during the winter months to provide about a teaspoonful of cod-liver oil each day for each member of the family. This is especially desirable for the children and for indoor workers, since cod-liver oil is rich in both vitamin D and vitamin A.

The pellagra-preventive factor is furnished mainly by lean meat, fish, milk, cheese, and eggs. Small amounts are contributed also by whole-grain cereal products, provided they contain the germ, and by tomatoes, dried peas, and beans. Persons suffering with pellagra should use 1 ounce of dried pure yeast daily until the symptoms disappear, and for several weeks thereafter.

The quantities of food materials indicated in each market order provide somewhat more food than the commonly accepted allowances for such family groups (see page 17). There is included a small margin for ordinary household waste but this does not allow for carelessness in handling, or for excessive loss of minerals or vitamins caused by poor methods of preparation.

If a choice must be made between fully satisfying the appetite with a one-sided diet (such as meal, salt pork, and molasses or sugar) and using a somewhat smaller amount of well-balanced food, including right proportions of milk, vegetables, and lean meats, the latter choice is wise. It will maintain health. The market orders are stated somewhat flexibly to permit some choice within the various food groups for adjustment to family dietary habits or special needs, and to enable families to purchase the food materials available and cheapest at different seasons in each community, if they desire to obtain adequate diets at minimum cost.

The cost of the food materials suggested in these market orders will depend upon the selection made within each food group, upon the quality of the food purchased, and upon local prices. The cost can be considerably reduced by purchasing in large quantities and by producing as much as possible at home.

Emergency Low-Cost Dietaries

A report of the food habits of white farmers in a section of the South where pellagra is endemic indicates that over long periods of the late winter and early spring the diet of many consists largely of white flour and corn meal, salt pork, sugar and molasses, some vegetables, and very small amounts of lean meat. Usually by June or July many of these people have symptoms of pellagra. Their dietaries are deficient in so many respects that almost any additional protective food improves them. The addition of milk - fresh, canned, or dried - to their usual diet makes a marked improvement in the health of these families. The use of a quart of fresh milk or a pound of canned milk per person per day, or 1 to 2 pounds of dry milk per person per week is suggested. If skim milk is used, it is desirable to add 1 to 2 ounces of cod-liver oil a week to the diet of each person. As a first step in improving these diets these supplements of milk can be highly recommended on the basis of actual experience.

Probably a pound of tomatoes per person per week might well be suggested as the second additional purchase if family resources are too inadequate and can not be sufficiently supplemented to insure the family the food supply indicated in the preceding low-cost market orders. Where pellagra actually exists 1 ounce of pure dried yeast per person per day should be taken until recovery is certain.

Many plantation owners are called upon to advance the food supply of tenants during the winter months. The problem of providing at a minimum cost food which will maintain or improve the health of the individuals is of great concern to commissary managers. Obviously it is poor economy to permit tenants to subsist on food which will cause the development of dietary-deficiency diseases, for this will definitely lower their working efficiency. It often happens, however, that the appetites of the tenants are satisfied with or that they even demand a one-sided food supply. Many sections of the colored population are used to diets of beans, meal, fatback, and molasses and become dissatisfied if it is modified too much. To improve such basal diets markedly without changing their appearance or texture much, it is suggested that as an emergency measure commissary managers offer "reenforced corn meal" in place of part of the white flour and cereal allowance. This "reenforced corn meal" may be made by mixing 72 parts yellow corn meal, 20 parts skim-milk powder, and 8 parts of pure dried yeast. Or a mixture may be made of 40 parts of wheat germ, 40 parts of corn meal, and 20 parts of dry skim milk (by weight). The wheat-germ product should be mixed from fresh materials each week, as wheat germ grows rancid on standing. If either mixture replaces one-half to two-thirds of the usual cereal allowance of families (see market order No. 3, Table 6), all the adults will probably remain free from pellagra. If the children receive the additional milk suggested in the following market orders they too will probably be free from the disease.

The combination and proportions of food materials suggested in the market orders for the tenant population may seem very limited and monotonous to persons accustomed to high American standards of living. However, they are offered without apology, for they are much more varied than the usual winter rations of many in this group, and it seems quite certain that the use of this combination and these amounts of food will improve the general health of these people. It should be emphasized that the adequacy of these market orders depends upon the use of tomatoes, milk, and yeast or wheat germ.* Although these dietaries are not considered optimum for nutrition, it is believed that they are adequate, and in accord with the habits and needs of the group for which they are planned. Furthermore, they can be obtained at a relatively small cost.

If the yeast or wheat germ can not be obtained, either market order No. 1 or No. 2 should be used instead of market order No. 3.

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*See note on page 8 for suggestions for obtaining wheat germ.

TABLE 6.-Emergency low-cost weekly market order No. 3 for families of different sizes

The orders below are suggested for the southern tenant population or for other roups of similar food habits, who are being fed from a central food supply. These ietaries are not considered optimum for nutrition, but it is believed that they re adequate provided the specifications are followed. These market orders will ot be adequate if the milk, tomatoes, yeast, or wheat germ are omitted, or if the mounts are reduced. Where it can be afforded, it would be desirable to add more egetables, milk, and lean meat and to reduce the quantity of beans.

Family composition	2 adults; 1 child aged 3 yrs.	2 adults; 3 children aged 2,4, 7 yrs.	2 adults; 5 children aged 2,5, 8,12,15 years.	3 adults; 7 children aged 2,4,6, 8,10,13,15 years.	4 adults
Food materials	Quantity	Quantity	Quantity	Quantity	Quantity
eenforced corn meal---- Corn meal*--------72 Pure dry yeast--- 8 Dry skim milk----20 or Corn meal*--------40 Wheat germ--------40 Dry skim milk----20	10 lbs.	12 lbs.	20 lbs.	30 lbs.	10 lbs.
hite flour, rice, grits, or meal--------	5-8 "	8-10 "	8-15 "	12-20 "	12-15 "
ilk, evaporated** (for children)------------	4-5 "	12-14 "	18-20 "	22-25 "	-
otatoes----------------	8-10 "	12-15 "	20-25 "	30-35 "	15-20 "
nions------------------	1 "	1 "	1-2 "	2 "	1 "
abbage or greens, carrots, turnips---------	5-8 "	8-10 "	10-15 "	15-20 "	7-9 "
anned tomatoes, eaten without further cooking-----------------	4 "	6 "	9 "	12 "	6 "
ried beans or peas-----	2-3 "	3-5 "	5-8 "	7-10 "	4-7 "
olasses, sorghum, or dark cane------------	1½ qts.	2 qts.	3-4 qts.	4-5 qts.	3 qts.
alt pork, bacon, fatback-----------------	1-2 lbs.	2 lbs.	2-3 lbs.	3-4 lbs.	3 lbs.
ard--------------------	1 "	1-2 "	2 "	3 "	2 "
anned salmon, lean meat or eggs (optional)----	1	1	1-2	2	1
ea or coffee					

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* Preferably yellow, for its vitamin A content.

** Or its equivalent in fresh or dried. See Table 8, Equivalent weights and measures.

Food Requirements of the Family Group

The energy requirements of family groups vary considerably because of the differences in muscular activity as well as differences in the sizes and ages of the individual members. Consequently an upper and a lower range are given for some food materials in the market orders. In planning the market orders the allowance made per day for a man weighing about 150 pounds at moderately active work was 3,000 calories, 67 grams of protein, 0.68 grams of calcium, 1.32 grams of phosphorus, and 0.015 grams of iron. This provides about a 50 per cent margin of safety above the average minimum requirements for protein, calcium, phosphorus, and iron. At active work, like farming, the same man would need more calories, probably 600 to 1,000 more per day, but the need for protein and minerals would not be similarly increased. At sedentary occupations he would need fewer calories than if he were at moderately active work. For the adult woman has been allowed 2,200-3,000 calories, depending largely on her activity; 67 grams protein; 1 gram calcium; 1.32 grams phosphorus; and 0.015 gram iron. The energy requirements of children are summarized in a table in the third edition of Rose's Laboratory Handbook for Dietetics, which is here reproduced as Table 7:

TABLE 7. - Average total energy requirements of children*

Age, years	Calories per day	
	Boys	Girls
1	900-1,200	800-1,000
2	1,100-1,300	1,000-1,250
3	1,100-1,400	1,050-1,350
4	1,200-1,500	1,150-1,400
5	1,300-1,600	1,200-1,500
6	1,500-1,900	1,450-1,800
7	1,600-2,100	1,500-1,900
8	1,700-2,300	1,600-2,200
9	1,900-2,500	1,800-2,500
10	2,100-2,700	1,900-2,600
11	2,100-2,800	2,000-2,800
12	2,300-3,000	2,100-3,000
13	2,500-3,500	2,300-3,400
14	2,600-3,800	2,400-3,000
15	2,700-4,000	2,400-2,800
16	2,700-4,000	2,200-2,800
17	2,800-3,800	2,100-2,800

*Laboratory Handbook on Dietetics by Mary Swartz Rose; third edition, 1929. By permission of the MacMillan Co., publishers.

The protein provides between 10 and 15 per cent of the total calories, allowing somewhat more than for the adult in terms of body weight. One gram of calcium has been allowed for every child up to the age of 13, and at least a gram of phosphorus for children over 2 years of age. Five milligrams of iron have been allowed for every 100 calories provided by the diet.

To make it easy to substitute various other forms of milk for fresh whole milk, bread for flour, molasses for sugar, and vice versa in the foregoing market orders, the following brief table of approximately equivalent weights and measures of selected food materials has been compiled from various sources.

TABLE 8. - Equivalent weights and measures of selected food materials

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These figures will prove useful in working with the various market orders suggested in this circular.

Milk:	
1 quart fresh whole	2.2 pounds.
1 quart fresh skim	2.2 pounds.
1 pound evaporated whole, unsweetened	2.4 pounds or 1 generous quart fresh whole.
1 pound dried whole	8 pounds or 3 3/4 quarts fresh whole.
4 1/2 ounces dried whole	1 quart fresh.
3 ounces dried skim*	1 quart fresh skim.
1 pound dried skim.*	11 pounds or 5 quarts fresh skim.
Bread:	
10-11 oz. flour	1 pound bread.
1 pound flour	1 1/2 pounds bread.
Eggs:	
1 dozen medium as purchased	1 1/2 pounds.
Molasses:	
Cane, 1 quart (2.9 pounds)	2 pounds cane or beet sugar.
Tomatoes:	
1 No. 3 can or 1 quart jar	2 pounds.
Fruit:	
1 pound dried............(approximate)	4-5 pounds fresh.

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*To substitute dry skim milk in any dietary which calls for fresh whole milk, allow for every 5 quarts of whole milk 1 pound of dry skim milk, and provide in addition 5 to 6 ounces of butter substitute or other fat, and 1 ounce of cod-liver oil.

Nutritive Values of Selected Food Materials

To make it easy to compare the nutritive values of the food materials in the respective food groups, and to substitute as desired within these groups, Table 9 has been compiled to show the nutritive values of one pound of each of the foods listed in the suggested market orders. A few foods not in the orders have been included in the table. It should be noted that unless otherwise stated these figures refer to the edible portion, not to the food as purchased.

TABLE 9.-Nutritive Values of 1 Pound of Selected Food Materials, in Grams (edible portion)

Compiled from various sources

Food materials	Calories	Protein grams	Calcium grams	Phosphorus grams	Iron grams
Cereals:					
Bread-					
White, water......	1,139	34.	.058	.269	.0029
Whole-wheat, water.	1,129	44	.091	.694	.0073
Corn meal.............	1,613	42	.082	.862	.0041
Flour-					
Graham...........	1,627	60	.177	1.651	.0168
Whole-wheat.......	1,633	63	.141	1.080	.0113
White............	1,603	51	.091	.417	.0045
Hominy grits..........	1,608	38	.050	.653	.0041
Rolled oats...........	1,803	76	.313	1.778	.0172
Rice, polished.........	1,591	36	.041	.435	.0041
Rice, unpolished......	1,592	36	.041	.939	.0091
Wheat germ............	1,803	132	.322	4.763	*
Rice polish...........	1,796	57	.136	7.666	*
Milk:					
Whole.................	314	15	.544	.422	.0011
Skim..................	166	15	.553	.435	.0011
Cheese, eggs, lean meats, and fish:					
Cheese................	1,996	131	4.223	3.098	.0059
Eggs..................	672	61	.304	.816	.0136
Beef**................	965	68	.39	.733	.0102
Salmon, fresh.........	922	100	.109	1.148	.0054
Vegetables:					
Beans and peas-					
Green string beans, fresh............	139	10	.209	.236	.0050
Dried navy beans....	1,564	102	.726	2.137	.0313
Dried peas.........	1,612	112	.381	1.814	.0259
Green leaves-					
Cabbage............	143	7	.204	.132	.0050
Chard, Swiss........	172	15	.680	.181	.0113
Kale...............	231	15	.962	.272	.0141
Mustard greens......	139	11	.998	.299	.0254
Spinach............	108	10	.304	.308	.0163
Turnip tops........	132	12	1.397	.249	.0299

*Indicates determinations not available

**Beef side, medium fat, as purchased.

Food materials	Calories	Protein	Calcium	Phosphorus	Iron
Potatoes					
Irish	378	10	.064	.263	.0059
Sweet	558	8	.086	.204	.0020
Root vegetables -					
Beets	209	7	.132	.177	.0027
Carrots	205	5	.254	.209	.0027
Onions	220	7	.154	.204	.0027
Turnips	179	3	.290	.209	.0023
Tomatoes	103	4	.050	.118	.0018
Fruits:					
Apples	290	1	.033	.054	.0014
Pears	315	5	.068	.118	.0014
Sugars:					
Molasses, cane	1501	11	.957	.200	.0331
Sugar, cane	1814	-	-	-	-
Fatty foods:					
Butter	3488	5	.068	.077	.0109
Lard	4082	-	-	-	-
Peanut butter	2487	117	.322	1.810	.0091
Salt pork, clear fat	3555	9	-	-	-

Some Facts About Pellagra

The following information on pellagra has been brought together from various publications of the United States Public Health Service, references to which will be found on page 22.

Cause and prevalence.

Although pellagra is directly due to a lack of the pellagra-preventive factor owing to an insufficient amount of certain foods, including milk and fresh lean meat, it is indirectly attributable to poverty. In studies made of the situation by the United States Public Health Service, Goldberger and his associates found a striking inverse relationship between family income and pellagra incidence, and a seasonal fluctuation of the disease corresponding to the ability of the family to obtain adequate diet.

Women and children most frequent victims.

Pellagra occurs in a mild form with great frequency among children from 2 to 15 years of age. It occurs very frequently also among women from 20 to 40 years of age, especially among those with families. It is suspected that many such women tend to deprive themselves of certain foods in favor of other members of the family. Growing children and expectant and nursing mothers probably need more of the pellagra-preventive factor than do other members of the family.

A seasonal disease.

Pellagra is practically nonexistent from November through February. In the late winter and early spring, the food supply of some families consists largely of highly refined cereals, fat salt pork and lard, and sugar and sirup. The absence of a sufficient quantity of the pellagra-preventive vitamin in this combination of foods brings on the disease by April or May and recurrent attacks

usually appear slightly earlier than the initial onset. The number of cases usually reaches a peak by June, after which it rapidly declines until by November most of the cases have disappeared.

In addition to this seasonal variation, there is a marked year-to-year fluctuation, inversely proportional to the purchasing power of the family or to the productiveness of the cow and garden, or both. In the wake of lowered wages as well as of such disasters as floods, hurricanes, or droughts, there is an increase in the number of cases of pellagra.

Curative value of yeast.

Dried bakers' or brewers' yeast is so rich in the pellagra-preventive factor that it is a cheap and specific cure and preventive for the disease. Experience shows, however, that yeast is usually considered as a medicine rather than as a food, and that its use is likely to be discontinued shortly after recovery is completed. Unless the diet has meantime improved, a recurrence of the disease may take place. For this reason all agencies should cooperate in helping families to procure a well-balanced food supply throughout the year.

Symptoms of pellagra.

A loss of strength, with indigestion or nervousness or both, appearing or increasing in the late winter or spring and improving in the fall, weariness, dizziness or vertigo, discomfort or pain in the pit of the stomach, headaches, wakefulness, and frequently also sluggish bowel action are common early symptoms of the disease. Such symptoms may, of course, be due also to causes other than pellagra. A burning or scalding of the mouth, reddened tongue, and burning of the hands and feet may be characteristics of later stages of pellagra, and their presence justifies a suspicion of the disease, especially if the individual is known to use a diet low in milk, meat, vegetables, and fruit. For such symptoms, counsel should be given as to improving the diet, but at the same time the individual should be urged to seek competent medical advice. The most definite and characteristic signs of the disease are the more or less bilaterally symmetrical skin lesions, at first appearing like sunburn, then turning a dirty brown color, parchment-like in texture, after which the skin becomes rough and scaly, and even cracks and peels. The eruption appears most frequently on the backs of the hands, feet, forearms, legs, neck, and back.

In children, a close observer may detect such symptoms as listlessness and fretfulness, loss of activity, and loss of weight, but these preliminary indications often escape notice until the appearance of the characteristic eruption.

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Bureau of Home Economics.

1929 Nutrition charts. Set of 9 black and white charts, each 15 by 23 inches. For sale by the Superintendent of Documents, Government Printing Office, Washington, D. C., per set, 50 cents.

Contents: 1. Growth is an index of nutrition. 2. Growth may be controlled by diet. 3. Bone growth may be stunted by diet. 4. Protein in the diet. 5. Calcium in the diet. 6. Phosphorus in the diet. 7. Vitamin A in the diet. 8. Vitamin B in the diet. 9. Vitamin C in the diet.